REMARKS

Applicant respectfully requests reconsideration of the claims of this application in light of the amendments and remarks presented herein. Also included in this response, and incorporated by reference herein, is the Declaration of Vijay K. Arora dated November 14, 2007, which was submitted February 13, 2008 ("Arora Decl.")

Claims 1-28 are pending in this application. As noted by the Examiner, claim 19 was inadvertently numbered claim 9. Claim 19 has been renumbered correctly as claim 19. By the present Amendment, claims 7, 8, 20, and 21 have been canceled and claims 1 and 14 have been amended. Support for this amendment can be found in the Specification at, for example, page 9, lines 7-9 and original claims 7, 8, 20 and 21.

REJECTIONS UNDER 35 U.S.C. §103

The Examiner has asserted a number of related rejections under 35 U.S.C. §103. As detailed below, the Applicants respectfully submit that the Examiner has erred substantively as to the requisite factual findings of *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and, therefore, request that these rejections be withdrawn.

Rejection 1 – Claims 1, 5-10, 13-14, 18-23, 25 and 27-28 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Polifka (U.S. Patent Publication 2002/0027173) and further in view of Dantzig (U.S. Patent No. 2,282,708), Moir (U.S. Patent No. 1,766,447) and Schytil (U.S. Patent No. 2,857,683). The pending claims require "a process for concurrently drying, roasting, and grinding green coffee beans in a single unit operation," in which "compressed heated air at a temperature within the range of about 375 °F to about 425 °F" is introduced into an enclosure, and, when green coffee beans are introduced into the enclosure, "at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching a lower end" of the enclosure.

As indicated by the Examiner, "Polifka teaches a system that can be used for comminuting, heating and drying and grinding into a powder agricultural products, such as grains, plants and herbs." Polifka does not teach or suggest that such a system may be used to concurrently dry, roast, and grind green coffee beans in a single unit

operation. Indeed, as set forth Mr. Arora's declaration, there are a multitude of reasons that one of ordinary skill in the art would **not** reasonably expect that the use of an apparatus such as described in Polifka with green coffee beans would provide a dried ground coffee powder that is concurrently **roasted to induce pyrolysis** such that it is comparable with green coffee beans roasted and ground using conventional methods.

First, it is well known in the art that, in conventional methods, coffee is prepared using the two separate and critical steps of: (1) roasting the whole green beans to a desired roast color for flavor and aroma generation; and (2) grinding the roasted whole beans into smaller size particles to accelerate release or extraction of coffee flavors, aromas and soluble solids during the brewing operation. Second, the roasting step is known in the art to be quite different and significantly more complex than merely drying agricultural products using a conventional dryer or a vortex grinding apparatus such as described in Polifka. *See* Arora Decl. ¶ 7.

As described in Mr. Arora's declaration, green coffee beans have traditionally been roasted as whole beans to ensure desired flavor, aroma and color development. Roasting is a time-temperature dependent process, whereby a number of **chemical and physical** changes are induced in the green coffee beans, including: (1) removal of moisture from the green coffee beans; (2) a sharp rise in bean temperature due to exothermic reactions; (3) initiation of Maillard reactions and pyrolysis for flavor, aroma and CO_2 gas generation; and (4) expansion of the coffee beans (density reduction). In conventional methods using continuous roasters, whole green beans must generally be roasted at a temperature above about 550 °F for at least about 2 minutes. *See* Arora Decl. ¶ 8.

As further noted by Mr. Arora, attempts to first grind the whole green beans and then roast have been unsuccessful due to several factors, including: (1) mechanical difficulties in the grinding and handling of green coffee beans, which have a moisture content in the range of about 8% to 14% by weight depending upon the type of beans, results in the green beans being distorted and turned to mush during grinding; (2) the ground mush is difficult to fluidize in the roaster, which results in a brown mass with burnt specs due to non-uniform heat transfer in the roasting chamber; and (3) the lack

of Maillard reactions necessary for flavor and aroma generation during roasting operation. *See* Arora Decl. ¶ 9.

Given this knowledge of the art, it was surprising and entirely unexpected for the Applicants to discover that the process of the present invention overcomes these problems and allows whole green coffee beans to be concurrently dried, roasted, and ground in a single unit operation using compressed heated air at a temperature considerably below that required in conventional roasting methods (i.e., in the range of about 375 °F to about 425°F), and yet, provides a coffee product that is comparable with coffee that is roasted and ground using conventional methods.

The Examiner, apparently recognizing the deficiencies of Polifka, has relied upon three decades-old references (i.e., Dantzig, Moir, and Schytil) to suggest "that it has been conventional in the art to apply a simultaneous process for roasting and grinding coffee beans into a powder" and that "a conical enclosure [may be used] for fluidizing coffee beans for the purpose of roasting the coffee beans." Applicants respectfully disagree and assert that Dantzig, Moir, and Schytil all fail to cure the deficiencies of Polifka's disclosure. The references do not render the present invention obvious, either alone or in combination with Polifka.

First, Dantzig, dated September 26, 1940, discloses a machine for a **two-stage** process for roasting coffee, followed by a cooling phase and a separate grinding step. *See* Dantzig, pg. 1, col. 2, lines 18-34. Green coffee beans are preheated in a hopper, then passed through a pair of pre-roasting rolls where the beans are simultaneously flattened and heated to a temperature that is insufficient to roast the beans. *See* Dantzig, pg. 2, col. 2, lines 5-12. Next, the beans pass through roasting rolls set close together and maintained at the roasting temperature (i.e., 500 °F) by electric heating coils, or other heating elements. *See* Dantzig, pg. 2, col. 1, lines 55-58, col. 2, lines 32-40. The coffee beans emerge from the roasting rolls in a roasted and flaked condition, and, from there, are passed through a cooling conduit. *See* Dantzig, pg. 2, col. 2, lines 47-53. Finally, once the roasted beans are sufficiently cooled to the point where some of the plasticity of the flaked product is lost, the beans are available for grinding at the grinding rolls. *See* Dantzig, pg. 2, col. 2, lines 54-59.

Nowhere does Dantzig teach or suggest that green coffee beans may be introduced into an enclosure and entrained in heated air (at a temperature within the range of about 375 °F to about 425 °F) spiraling downward through the enclosure, wherein at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching the lower end of the enclosure. Rather, Dantzig teaches a multi-unit operation including (1) preheating in a hopper, (2) pre-roasting and flattening at pre-roasting rollers, (3) roasting at separate roasting rollers, (4) cooling at a cooling conduit, and (5) grinding at separate grinding rollers. Dantzig is simply a combination of separate roasting, cooling, and grinding steps in one container.

Moir, dated February 20, 1926, also fails to teach or suggest that green coffee beans may be introduced into an enclosure and entrained in heated air spiraling downward through the enclosure, wherein at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching the lower end of the enclosure. Moir teaches the use of electric heating elements in grinding plates of an attrition grinding machine. *See* Moir, pg. 1, col. 1, lines 27-30. Although Moir states that the invention is not limited to the grinding and calcining of any particular material, it is said to be "particularly designed for simultaneous grinding and calcining mineral ores such as gypsum to form plaster of paris; for simultaneously grinding and dehydrating coal and similar fuels to form powdered fuel . . . [and] for grinding and heating bituminous shales to separate their volatile contents fro their asphaltic nuclei." *See* Moir, pg. 1, col. 1, lines 5-15. Moir does not disclose how such a system might be utilized to prepare a dried, roasted, and ground coffee product, but teaches grinding raw gypsum "at around five hundred degrees F." Thus, Moir does not teach or suggest a process comprising introducing heated air at a temperature of about 375 °F to about 425 °F into an enclosure and introducing green coffee beans into the enclosure so that "at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching a lower end" of the enclosure.

Finally, the Schytil, dated May 10, 1954, is cited as teaching the use of a conical enclosure for fluidizing green coffee beans for the purpose of roasting the coffee beans.

Indeed, Schytil is directed to a process of roasting coffee involving the use of a conical enclosure in the form of a Venturi tube for fluidizing coffee beans. *See* Schytil, col. 2, lines 43-49. Schytil is aimed at providing a homogenously roasted product that has not lost a significant amount of component substances, has no bad tasting cracking components, and has a greater percent of aromatic components sealed in the material. Schytil is **not** directed to a process for concurrently drying, roasting and grinding green coffee beans. In fact, Schytil specifically cautions against increasing the velocity of the air in the roaster to the point where grinding might occur. *See* Schytil, col. 4, lines 1-10. This express teaching-away from the process of the present invention is entirely consistent with the knowledge and belief in the art that green coffee beans must generally be roasted as whole beans to ensure desired flavor, aroma and color development, and that attempts to first grind the whole green beans and then roast have been unsuccessful due to the mechanical difficulties in grinding the high-moisture green coffee beans and the resulting non-uniform heat transfer and lack of necessary flavor and aroma generation. *See* Arora Decl. ¶ 9.

Indeed, only Applicants' specification suggests that whole green coffee beans may be introduced into an enclosure and entrained in heated air (at a temperature within the range of about 375 °F to about 425 °F) spiraling downward through the enclosure so that at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching the lower end of the enclosure. Applicants respectfully submit that the Examiner has again effectively concluded that since someone (i.e., the Applicants) have shown that the device of Polifka is capable of doing something, that it would have been obvious to one of ordinary skill in the art to do so despite the knowledge in the art to the contrary and the express teaching-away from the invention in the prior art. Despite the apparent commercial advantages of a system capable of providing ground roasted coffee in fewer process steps and with less equipment requirements than conventional methods, no known commercialized product has done so. That need had remained unsolved prior to the present Applicants' work. *See* Arora Decl. ¶ 10.

For all of the foregoing reasons, the present invention would not have been obvious over Polifka in view of Dantzig, Moir, and/or Schytil to one of ordinary skill at

the time of the invention. A person of ordinary skill in the art would simply not reasonably expect that a vortex grinding apparatus, such as described in Polifka, could be used with whole green beans in "a process for concurrently drying, roasting, and grinding green coffee beans in a single unit operation," in which "compressed heated air at a temperature within the range of about 375 °F to about 425 °F" is introduced into an enclosure, and, when green coffee beans are introduced into the enclosure and entrained in the heated air spiraling downward through the enclosure, "at least a portion of the green coffee beans are concurrently dried, roasted to induce pyrolysis, and ground in a single unit operation before reaching a lower end" of the enclosure.

Rejection 2 – Claims 2 and 15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Polifka, in view of Dantzig, Moir, and Schytil, as applied in Rejection 1, and further in view of Pultinas Jr. (U.S. Patent No. 4,591,508). Pultinas Jr. is relied upon to teach a moisture content after roasting, drying, and grinding to be between 3 and 5 percent.

Claims 2 and 15 are allowable for at least the reasons discussed above with respect to Rejection 1. The primary reference, Polifka, and secondary references, Dantzig, Moir, and Schytil, have been discussed above in detail and that discussion is hereby incorporated by reference. Pultinas Jr. does not correct the deficiencies of the primary and secondary references detailed above.

Pultinas Jr. does, as indicated by the Examiner, teach a moisture content of the processed coffee of between 3 and 6 percent. However, it is clear that the coffee beans in Pultinas Jr. are roasted and ground in separate steps. Indeed, the grinding itself takes place in a two stage process. In the first stage, the roasted coffee beans are subjected to a coarse grind followed by a second stage wherein the coarse grind is further ground to the desired extent in a roll mill using a range of carefully defined coffee feed rates, roll mill pressures, and roll peripheral surface speeds. The coffee beans are not concurrently dried, roasted, and ground in a single unit operation as required by the present claims. Applicants respectfully request that this rejection be withdrawn.

Rejection 3 – Claims 3, 4, 11, 16, 17, and 24 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Polifka in view of Dantzig, Moir, and Schytil,

as applied in Rejection 1, and further in view of Reeves et al. (U.S. Patent No. 3,821,430). Reeves et al. is relied upon with regard to teaching the importance of a particular particle size range.

Claims 3, 4, 11, 16, 17, and 24 are allowable for at least the reasons discussed above with respect to Rejection 1. Again, the primary reference, Polifka, and secondary references, Dantzig, Moir, and Schytil, have been discussed above in detail and that discussion is hereby incorporated by reference. Reeves et al. does not correct the deficiencies of the primary and secondary references detailed above.

Reeves et al. provides an instant coffee blend composed of two dissimilarly surface dried coarse granular extracts. The first extract is a quality freeze dried component and the second extract is preferably a lower quality lightly roasted Robusta coffee containing irregularly surfaced agglomerates derived by spray drying and fusion agglomeration. Abstract. There is no teaching or suggestion that coffee beans could be concurrently dried, roasted, and ground in a single unit operation as required by the present claims. Applicants respectfully request that this rejection be withdrawn.

Rejection 4 – Claims 2-4, 11, 12, 15-17, 24, and 26 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Polifka in view of Dantzig, Moir, and Schytil, as applied in Rejection 1, and further in view of Ruiz-Avila (International Publication No. WO 00/01256). Ruiz-Avila is relied upon to teach "a method of comminuting . . . and drying plant material using heated air . . . that passes into a conical chamber . . . further comprising an exhaust pipe . . . and a rotary valve . . . for discharging said material" as well as "means for selectively recycling . . . the process material of insufficient particle size" (citations omitted).

Claims 2-4, 11, 12, 15-17, 24, and 26 are allowable for at least the reasons discussed above with respect to Rejection 1. Again, the primary reference Polifka and secondary references, Dantzig, Moir, and Schytil, have been discussed above in detail and that discussion is hereby incorporated by reference. Ruiz-Avial does not correct the deficiencies of the primary and secondary references detailed above.

As shown in Figure 2, Ruiz-Avial provides a low temperature dryer using a cold aerosolizer 34 for drying plant material with air. A cyclone 38 is used to separate air and aerosol from the partially dried plant material. A rotary valve 39 is used at the

bottom of the cyclone to remove the partially dried plant material to another drying tower 42 and then to a second cyclone 46 wherein air and the dried plant material are separated. The dried plant material is then removed through rotary valve 47. There is no teaching or suggestion that plant materials such as coffee beans could be concurrently dried, roasted, and ground in a single unit operation as required by the present claims. Applicants respectfully request that this rejection be withdrawn.

Rejection 5 – Claims 12 and 26 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Polifka in view of Dantzig, Moir, and Schytil as applied in Rejection 1, and further in view of Eichner (U.S. Patent Publication No. 2004/0142078). Eichner is relied upon to teach certain components of use in a coffee roasting process (e.g., valve to allow discharge of roasted coffee; use of apertures to release coffee beans; transfer valve with pressure release value to discharge coffee beans).

Claims 12 and 26 are allowable for at least the reasons discussed above with respect to Rejection 1. Again, the primary reference, Polifka, and secondary references, Dantzig, Moir, and Schytil, have been discussed above in detail and that discussion is hereby incorporated by reference. Eichner does not correct the deficiencies of the primary and secondary references detailed above. Eichner is directed to a pressurized roaster for coffee beans. There is no teaching or suggestion that coffee beans could be concurrently dried, roasted, and ground in a single unit operation as required by the present claims. Applicants respectfully request that this rejection be withdrawn.

Rejection 6 – Claims 1, 5, 6, 9, and 14 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 10, 11, and 14 of co-pending Application No. 11/153435 in view of Polifka, Moir and Schytil. Applicants respectfully traverse this provisional rejection but will, nonetheless, submit a timely filed terminal disclaimer to overcome the rejection and advance the prosecution of this application.

Rejection 7 – Claims 1, 5, 9, 10, and 14 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6, 11, 12, and 16 of co-pending Application No. 11/152387 in view of Polifka, Moir, Schytil, and Martin et al. (Elselvier). Applicants respectfully traverse this

provisional rejection but will, nonetheless, submit a timely filed terminal disclaimer to overcome the rejection and advance to prosecution of the application.

Rejection 8 – Claims 1, 5-7, 9, 10, and 14 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 15-21 of co-pending Application No. 10/963746 in view of Polifka, Moir, and Schytil. Applicants respectfully traverse this provisional rejection but will, nonetheless, submit a timely filed terminal disclaimer to overcome the rejection and advance to prosecution of the application.

CONCLUSION

In view of the foregoing, Applicants submit that claims 1-6, 9-19, and 22-28 are patentable over the cited references and hereby respectfully request reconsideration and allowance of claims 1-6, 9-19, and 22-28.

The Commissioner is hereby authorized to charge any additional fees which may be required in the Application to Deposit Account No. 06-1135.

Respectfully submitted,

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